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EXAMINER	
SHARON, AYAL I	
ART UNIT	PAPER NUMBER
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/516,903	LECKENBY, MARK	
	Examiner	Art Unit	
	Ayal I. Sharon	2123	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 December 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-35* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-35* is/are rejected.

7)☒ Claim(s) *33-34* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *03 December 2004* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *3/24/05, 10/6/05, 5/4/07*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Introduction

1. Claims 1-35 of U.S. Application 10/516,903 filed on 12/03/2004 are currently pending.
2. This application is a 371 of PCT/AU03/00700 filed on 06/05/2003, and also claims benefit of Australian Application PS 2784 filed on 06/06/2002.
3. This application has been published in the U.S. as U.S. PG-PUB 2005/0171706 on Aug.4, 2005.

Drawings

4. This application has been filed with informal drawings which are acceptable for examination purposes only. Formal drawings will be required when the application is allowed.

Claim Objections

5. Claims 33 and 34 objected to because of the following informalities: Claim 33 depends from itself. Claim 34 depends from itself. Appropriate correction is required. Examiner has examined the claims with the assumption that they both depend from claim 32.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

6. Claims 1-8 and 23-35 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while it is enabling for "aperture antennas" (see para. [0090] of the specification, according to the numbering in the PG-PUB) and "wire antennas" (see para. [0136]), it does not reasonably provide enablement for all "radiating devices" as claimed. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention commensurate in scope with these claims.

7. The specification is not enabling for all "radiating devices" because of the wide variety of radiating devices not discussed in the specification. For example, the book RF and Microwave Circuit and Component Design for Wireless Systems teaches (see p.473) that in addition to the categories of wire antennas and aperture antennas, there are also "printed antennas", which include "patch, printed dipole, and spiral" antennas. These are displayed in Fig.12.2 on p.474 of Chang. The instant specification does not discuss these types of antennas, which differ from wire and aperture antennas.

8. Claims 1-22 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while it is enabling for determining "power density levels" (see paras. [0124] and [0130]), it does not reasonably provide enablement for any

other "radiation characteristics" as claimed. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention commensurate in scope with these claims.

9. The specification does not list any other "radiation characteristics" that can be determined, much less enable the method for determining them.

Claim Rejections - 35 USC § 102

10. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

11. The prior art used for these rejections is as follows:

    a. Chang, K. Handbook of Microwave and Optical Components, pp.503-521. © 1989. ("**Chang Handbook**").

    b. Chang, K. et al., RF and Microwave Circuit and Component Design for Wireless Systems, pp.473-480 and 504-511, © 2002. ("**Chang RF**").

12. The claim rejections are hereby summarized for Applicant's convenience. The detailed rejections follow.

13. **Claims 1-7, 19-21 and 28 are rejected under 35 U.S.C. 102(b) as being anticipated by Chang Handbook.**

14. In regards to Claim 1, Chang Handbook teaches the following limitations:

1. (Original) A method for determining field radiation levels for a radiating device comprising

determining far field radiation characteristics of a radiating device,

providing a model of the radiating device, which model approximates the determined far field radiation characteristics and

determining a near field radiation characteristic from the model for at least one point in space.

(See Chang Handbook, especially: pages 514-516)

15. In regards to Claim 2, Chang Handbook teaches the following limitations:

2. (Original) The method as claimed in claim 1 including the step of determining a boundary between the near field and far field radiation of the radiating device.

(See Chang Handbook, especially: pages 514-516)

16. In regards to Claim 3, Chang Handbook teaches the following limitations:

3. (Currently amended) The method as claimed in claim 1 including the step of determining near field radiation density from the model.

(See Chang Handbook, especially: pages 514-516)

17. In regards to Claim 4, Chang Handbook teaches the following limitations:

4. (Original) The method as claimed in claim 3 including the step of determining power density level over a plurality of positions in space.

(See Chang Handbook, especially: pages 514-516)

18. In regards to Claim 5, Chang Handbook teaches the following limitations:

5. (Original) The method as claimed in claim 4 including the step of determining beam width characteristics of the radiating device in two orthogonal far field radiation patterns.

(See Chang Handbook, especially: pages 516-519)

19. In regards to Claim 6, Chang Handbook teaches the following limitations:

6. (Original) The method as claimed in claim 5 including the step of determining the 3dB beam width in two orthogonal far field radiation patterns.

(See Chang Handbook, especially: pages 516-519. While the reference does not expressly teach the value of 3dB, it does teach that on p.517 that "[i]t is evident from this relationship that a large antenna is required to produce a pattern of narrow beamwidth, while a small antenna will radiate a broad beam.")

20. In regards to Claim 7, Chang Handbook teaches the following limitations:

7. (Original) The method as claimed in claim 6 including the step of determining physical characteristics of the radiating device to determine the far field radiation characteristics.

(See Chang Handbook, especially: pages 516-519. The reference expressly teaches on p.517 that "[i]t is evident from this relationship that a large antenna is required to produce a pattern of narrow beamwidth, while a small antenna will radiate a broad beam.")

21. In regards to Claim 19, Chang Handbook teaches the following limitations:

19. (Currently amended) The method as claimed claim 1 wherein the radiating device is an aperture antenna.

(See Chang Handbook, especially: pages 514-519. The reference expressly teaches on p.514 in the section titled "Aperture Antennas: Near Field and Far Field" that "Microwave antennas are usually designed to provide high directivity gain and narrow beamwidth. Most of these antennas belong to the class of aperture antennas ...")

22. In regards to Claim 20, Chang Handbook teaches the following limitations:

20. (Original) The device as claimed in claim 19 including the step of determining the physical characteristics of the radiating device and providing a model including representing the aperture by at least one Huygen's wavelet source.

(See Chang Handbook, especially: Table 10.1 on page 518.)

23. In regards to Claim 21, Chang Handbook teaches the following limitations:

21. (Original) The method as claimed in claim 20 including the step of summing the contribution from each wavelet source to each point in space.

(See Chang Handbook, especially: Equations 10.23 to 10.32 on pages 516-518.)

24. In regards to Claim 28, Chang Handbook teaches the following limitations:

28. (Original) A method of determining field radiation levels for a radiating device comprising the steps of
determining far field radiation characteristics of a radiating device.,
determining the boundary between near field and far field radiation,
determining the displacement of a point in space relative to the closest point on the radiating device and
calculating the power density level at the point in space.

(See Chang Handbook, especially: pages 514-516)

25. **Claims 23-25 and 35 are rejected under 35 U.S.C. 102(b) as being anticipated by Chang RF.**

26. In regards to Claim 23, Chang RF teaches the following limitations:

23. (Original) A method of estimating radiation power density of electromagnetic radiation comprising the steps of
determining a model for a radiating device based on radiation patterns,
representing the radiation device as a plurality of point sources which radiate electromagnetic radiation,
estimating power density level at a plurality of positions in space for each point source and
determining the total power density level at each position, by summing the contribution of each point source to the respective positions in space.

(See Chang RF, especially: pages 506-511)

27. In regards to Claim 24, Chang RF teaches the following limitations:

24. (Original) The method as claimed in claim 23 including the step of displaying the power density level for a plurality of positions.

(See Chang RF, especially: pages 506-511)

28. In regards to Claim 25, Chang RF teaches the following limitations:

> *25. (Original) The method as claimed in claim 24 including summing the power density level determined at each position for all point sources representing the radiating device.*

(See Chang RF, especially: pages 506-511)

29. In regards to Claim 35, Chang RF teaches the following limitations:

> *35. (Original) The method as claimed in claim 23 wherein the model for the radiating device is determined from two orthogonal far field radiation patterns.*

(See Chang RF, especially: pages 506-511)

Claim Rejections - 35 USC § 103

30. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

31. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35

U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

32. The prior art used for these rejections is as follows:

    a. Chang, K. Handbook of Microwave and Optical Components, pp.503-521. © 1989. ("**Chang Handbook**").

    b. Chang, K. et al., RF and Microwave Circuit and Component Design for Wireless Systems, pp.473-480 and 504-511, © 2002. ("**Chang RF**").

33. The claim rejections are hereby summarized for Applicant's convenience. The detailed rejections follow.

34. Claims 8-18 and 29-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chang Handbook in view of Chang RF.

35. In regards to Claim 8, Chang Handbook does not expressly teach the claimed limitations:

> *8. (Original) The method as claimed in claim 7 including the step of providing a model including representing the device by a plurality of radiation sources.*

Chang RF, on the other hand, expressly teaches that the use of "an array of antennas working simultaneously ... [for] the reception of transmission of energy in a particular direction." (See Chang RF, page 506).

Chang Handbook and Chang RF are analogous art because they are from the same field of endeavor of Microwave component design.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the antenna analysis techniques of Chang Handbook with those of Chang RF.

The suggestion/motivation for combining the references would have been the express teaching in Chang RF that the use of "an array of antennas working simultaneously can focus the reception of transmission of energy in a particular direction, which increases the useful range of a system." (See Chang RF, page 506).

Therefore, it would have been obvious to a person of ordinary skill in the art to modify Chang Handbook with Chang RF to obtain the invention as specified in Claim 8.

36. In regards to Claim 9, Chang Handbook does not expressly teach the claimed limitations:

> *9. (Currently amended) The method as claimed in claim 1 wherein the radiating device comprises a wire antenna.*

Chang RF, on the other hand, expressly teaches that wire antennas are one of the three categories of antennas (see pp.473-474), and teaches the use of Yagi-Uda antennas which are composed of wire segments (see pp.473-474), helix antennas which are one type of wire antenna (see pp.473-474 and 504-506), calculating far field power (see pp. 475-478), and the use of antenna arrays (see pp.506-511).

Chang Handbook and Chang RF are analogous art because they are from the same field of endeavor of Microwave component design.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the antenna analysis techniques of Chang Handbook with those of Chang RF.

The suggestion/motivation for combining the references would have been the express teaching in Chang RF that the use of "an array of antennas working simultaneously can focus the reception of transmission of energy in a particular direction, which increases the useful range of a system." (See Chang RF, page 506).

Therefore, it would have been obvious to a person of ordinary skill in the art to modify Chang Handbook with Chang RF to obtain the invention as specified in Claim 8.

37. In regards to Claim 10, Chang Handbook does not expressly teach the claimed limitations:

> *10. (Original) The method as claimed in claim 9 including the step of providing a model including representing the radiating device by a plurality of wire elements.*

Chang RF, however, does teach these elements. This claim is rejected on the same grounds as claims 8 and 9.

38. In regards to Claim 11, Chang Handbook does not expressly teach the claimed limitations:

> *11. (Original) The method as claimed in claim 10 including the step of estimating the length and spacing of each wire element forming the radiating device.*

Chang RF, however, does teach these elements. This claim is rejected on the same grounds as claims 8 and 9.

39. In regards to Claim 12, Chang Handbook does not expressly teach the claimed limitations:

> *12. (Original) The method as claimed in claim 11 wherein each wire element is represented as a radiation source.*

Chang RF, however, does teach these elements. This claim is rejected on the same grounds as claims 8 and 9.

40. In regards to Claim 13, Chang Handbook does not expressly teach the claimed limitations:

> *13. (Original) The method as claimed in claim 12 including the step of calculating mutual coupling between all the wire elements.*

Chang RF, however, does teach these elements. This claim is rejected on the same grounds as claims 8 and 9.

41. In regards to Claim 14, Chang Handbook does not expressly teach the claimed limitations:

> *14. (Original) The method as claimed in claim 13 including the step of assembling an N by N impedance matrix and calculating the voltage for each element to determine the current in each element.*

Chang RF, however, does teach these elements. This claim is rejected on the same grounds as claims 8 and 9.

42. In regards to Claim 15, Chang Handbook does not expressly teach the claimed limitations:

> *15. (Original) The method as claimed in claim 14 including the step of multiplying the inverse impedance matrix by the column voltage vector to determine the current in each element.*

Chang RF, however, does teach these elements. This claim is rejected on the same grounds as claims 8 and 9.

43. In regards to Claim 16, Chang Handbook teaches the following limitations:

16. (Original) The method as claimed in claim 15 including the step of assigning a Huygen's wavelet point source to each element and calculating the magnitude and phase of each wavelet point source from the current determined.

(See Chang Handbook, especially: Table 10.1 on page 518.)

44. In regards to Claim 17, Chang Handbook teaches the following limitations:

17. (Original) The method as claimed in claim 16 including the step of summing the contribution of each point source to each point in space within the near field.

(See Chang Handbook, especially: pages 514-516)

45. In regards to Claim 18, Chang Handbook teaches the following limitations:

18. (Currently amended) The method as claimed in claim 1, including the step of providing a single point source for each element with a length less than half a wavelength.

(See Chang Handbook, especially: pages 514-516)

46. In regards to Claim 29, Chang Handbook does not expressly teach the claimed limitations:

29. (Original) The method as claimed in claim 28 including the step of modeling the radiating device as a plurality of point sources.

Chang RF, however, does teach these elements. This claim is rejected on the same grounds as claims 8 and 9.

47. In regards to Claim 30, Chang Handbook does not expressly teach the claimed limitations:

30. (Original) The method as claimed in claim 29 including the step of applying a closest point algorithm to determine the power density level at each point in space.

Chang RF, however, does teach these elements. This claim is rejected on the same grounds as claims 8 and 9.

48. In regards to Claim 31, Chang Handbook does not expressly teach the claimed limitations:

> *31. (Original) The method as claimed in claim 30 wherein the closest point algorithm determines the displacement of the point in space from the closest point on the radiating device.*

Chang RF, however, does teach these elements. This claim is rejected on the same grounds as claims 8 and 9.

49. In regards to Claim 32, Chang Handbook does not expressly teach the claimed limitations:

> *32. (Original) The method as claimed in claim 31 wherein the closest point algorithm calculates X, Y, Z displacement vectors from the point in space to the closest point on the radiating device and calculates azimuth and elevation angles to the closest point.*

Chang RF, however, does teach these elements. This claim is rejected on the same grounds as claims 8 and 9.

50. In regards to Claim 33, Chang Handbook does not expressly teach the claimed limitations:

> *33. (Original) The method as claimed in claim 33 wherein the closest point algorithm determines the orientation of the radiating device and scales the power density level determined according to the orientation of the radiation device.*

Chang RF, however, does teach these elements. This claim is rejected on the same grounds as claims 8 and 9.

51. In regards to Claim 34, Chang Handbook does not expressly teach the claimed limitations:

> *34. (Original) The method as claimed in claim 34 wherein the closest point algorithm calculates the power density level using the power density formula and incorporates any modification factor applicable if the point in space is in the near field.*

Chang RF, however, does teach these elements. This claim is rejected on the same grounds as claims 8 and 9.

52. Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chang RF in view of Chang Handbook.

53. In regards to Claim 8, Chang RF does not expressly teach the claimed limitations:

> *26. (Original) The method as claimed in claim 25 including the step of calculating far field and near field tapering characteristics for each position.*

Chang Handbook, on the other hand, expressly teaches calculating far field and near field tapering characteristics for each position (See Chang Handbook, pages 514-516).

Chang RF and Chang Handbook are analogous art because they are from the same field of endeavor of Microwave component design.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the antenna analysis techniques of Chang RF with those of Chang Handbook.

The suggestion/motivation for combining the references would have been the express teaching in Chang RF that the use of "an array of antennas working simultaneously can focus the reception of transmission of energy in a particular direction, which increases the useful range of a system." (See Chang RF, page 506), while Chang Handbook teaches the far field and near field calculations for a single antenna.

Therefore, it would have been obvious to a person of ordinary skill in the art to modify Chang Handbook with Chang RF to obtain the invention as specified in Claim 26.

Allowable Subject Matter

54. The following claims contain allowable subject matter that cannot be rejected on the basis of the cited prior art. These claims, however, have been rejected under 35 USC §112.

55. In regards to Claim 22, neither Chang Handbook nor Chang RF teach the following limitations:

> *22. (Original) The method as claimed in claim 21 wherein the power density level at any point in space is determined using the formula*
>
> *Pd = ((PoweratAntenna)*10^((Gd+2.15)/10)) / (4πD*i^2)*

56. In regards to Claim 27, neither Chang Handbook nor Chang RF teach the following limitations:

> *27. (Original) The method as claimed in claim 26 including the step of calculating the power density level at a point in space by using the power density formula*
>
> *Pd = ((PoweratAntenna)*10^((Gd+2.15)/10)) / (4πD*i^2)*
>
> *for far field radiation and modifying the far field power density formula for near field radiation, which modification affects the antenna gain, power sent to the antenna and the distance from the antenna to the point source.*

Conclusion

57. The following prior art, made of record and not relied upon, is considered pertinent to applicant's disclosure.

58. Saad, T. et al., Microwave Engineer's Handbook, Vol.2, pp.32-38. © 1971. (Teaches charts and formulas for calculating near field and far field power for antennas. Cited by applicant in para. [0087] of the specification).

59. Hansen et al., U.S. Patent 3,879,733. ("**Hansen**").

Correspondence Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ayal I. Sharon whose telephone number is (571) 272-3714. The examiner can normally be reached on Monday through Thursday, and the first Friday of a bi-week, 8:30 am – 5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul Rodriguez can be reached at (571) 272-3753.

Any response to this office action should be faxed to (571) 273-8300, or mailed to:

USPTO
P.O. Box 1450
Alexandria, VA 22313-1450

or hand carried to:

USPTO
Customer Service Window
Randolph Building
401 Dulany Street
Alexandria, VA 22314

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Tech Center 2100 Receptionist, whose telephone number is (571) 272-2100.

Ayal I. Sharon
Art Unit 2123
January 2, 2008

PAUL RODRIGUEZ
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2100